

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Implementation of the	)	
Telecommunications Act of 1996:	)	
	)	CC Docket No. 96-150
Accounting Safeguards Under the	)	
Telecommunications Act of 1996	)	

**DECLARATION OF ROBERT M. BELL  
ON BEHALF OF AT&T CORP.**

April 8, 2002

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ON BEHALF OF AT&T CORP.**

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1. My name is Robert M. Bell. My business address is AT&T Labs-Research, 180 Park Avenue, Florham Park, New Jersey 07932.
2. I received a Ph.D. in Statistics from Stanford University in 1980.
3. From 1980 to 1998, I was promoted to Senior Statistician at RAND, a non-profit institution that conducts public policy analysis. While at RAND, I supervised the statistical design and/or analysis of many projects, including several large multi-site evaluations. I also headed the RAND Statistics Group from 1993 to 1995 and taught statistics in the RAND Graduate School from 1992 to 1998. In 1998, I joined the Statistics Research Department at AT&T Labs-Research, where I am a Principal Member of Technical Staff. My main research area is survey research methods.
4. I have authored or co-authored fifty articles on statistical analysis that have appeared in a variety of refereed, professional journals. I am a fellow of the American Statistical Association. I am currently a member of the Committee on National Statistics organized by the

National Academy of Sciences as well as the Academy's Panel to Review the 2000 Census. I have attached a copy of my curriculum vitae as Exhibit RMB-1.

**I. PURPOSE AND SUMMARY OF DECLARATION**

5. The purpose of this declaration is to address certain statistical and non-statistical methodologies that the auditors used to collect and analyze the evidential matter that serves as the basis for findings in the Auditor's Initial Biennial Report and Auditor's Supplemental Biennial Report (collectively "the audits") in connection with the first biennial Section 272 audit of the Verizon companies. Part II explains that the audits at issue are fundamentally infirm because the auditors failed to comply with audit procedures that required an examination of all elements in the population when evaluating certain test criteria. As a result, the auditors not only deviated from prescribed agreed-upon audit procedures, but they also rendered findings that are inherently less accurate than they would have been if the entire population of interest had been analyzed.

6. Part III shows that, even when the auditors used sampling techniques, they consistently violated the most basic sampling standards and compounded these errors by deviating from other audit procedures. Because of these deficiencies which taint numerous test criteria, many of the audit findings that suggest compliance by Verizon with particular Section 272 obligations are misleading or meaningless.

7. Part IV explains that even the performance data in the audits reveal that Verizon has violated Section 272 by providing preferential treatment to Verizon affiliates. Although Verizon characterizes the performance results showing discriminatory treatment as "statistically meaningless," the limited data provided in the audits reveal that the differences in

performance results are statistically significant. For all of these reasons, there is no sound basis upon which any finding can be reached that Verizon has complied with Section 272.

**II. THE AUDITORS FAILED TO EXAMINE THE ENTIRE POPULATION WHEN INSTRUCTED.**

8. The audits are fundamentally flawed because the auditors failed to adhere to audit procedures that required an examination of the entire population when evaluating Verizon's compliance with certain test criteria. In this regard, an auditor can use an array of techniques to collect and assess the evidential matter that forms the basis for audit findings. Audit sampling, which involves an examination of less than 100% of the elements or units in a given population, is one such technique. However, one of the risks of sampling is that the auditor may render an erroneous finding because the entire population was not examined.<sup>1</sup> In recognition of this risk and to assure greater accuracy in reported results, the audit plan may require an examination of the entire population at issue when assessing an entity's compliance with specified requirements.

9. The *General Standard Procedures for Biennial Audits Required Under Section 272 of the Communications Act of 1934, As Amended* ("General Standard Procedures") require that sampling techniques be used to evaluate certain test criteria. Furthermore, the audit procedures also specify that the total population of interest must be analyzed in assessing

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<sup>1</sup> See AMERICAN INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS, AUDIT SAMPLING 10 (1999) (stating that "[s]ampling risk arises from the possibility that when a test of controls or substantive test is restricted to a sample, the auditor's conclusions might be different from those that would have been reached if the test were applied in the same way to all the items in the account balance or class of transactions").

compliance with other test criteria. However, in several instances, the auditors failed to examine the entire universe in measuring Verizon's compliance with those test objectives.

10. In this regard, Section 272(b)(2) provides that interLATA affiliates must "maintain books, records, and accounts in the manner prescribed by the Commission which shall be separate from the books, records, and accounts maintained by the Bell operating company of which it is an affiliate." 47 U.S.C. § 272(b)(2). *See also General Standard Procedures*, Objective II at 22. Objective II of the audits is purportedly designed to assess compliance with this requirement. The *General Standard Procedures* provide that the following procedure should be used to assess compliance with this objective:<sup>2</sup>

Cash Receipts — For the ninth month of the engagement period, [the auditor should] obtain a list of *all* collections from the sale of trade accounts receivable from the 272 affiliate to the affiliate. Document the process for how the 272 affiliate receives credit for these collections and verify that collection of the trade accounts receivable was reflected in the accounts of the 272 affiliate (emphasis added).

11. Although the audit procedures explicitly required the auditors to "obtain a list of *all* collections from the sale of trade accounts receivables from the 272 affiliate to the affiliate," the auditors randomly selected 10 cash receipts and 10 cash disbursements from BACI's account at FSI. After comparing the selected receipts and disbursements against BACI's records, the auditors found no violations of record-keeping requirements. Initial Biennial Report, App. A,

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<sup>2</sup> *General Standard Procedures*, Objective II, Procedure 3.

Objective II, Procedure 3.<sup>3</sup> However, the auditors' failure to evaluate all collections undermines the credibility of this finding.

12. Similarly, Objective V of the audits purportedly assesses whether the Section 272 affiliate "has conducted all transactions with the Bell operating company ["BOC"] on an arm's length basis with the transactions reduced to writing and available for inspection." *General Standard Procedures*, Objective V. Furthermore, Objective VI ostensibly evaluates whether the BOC has properly "accounted for all transactions with the separate affiliate in accordance with the accounting principles and rules approved by the Commission." *Id.*, Objective VI. The audit procedures for Objectives V and VI required that the auditors compare the prices, terms and conditions of services and assets on the website of the interLATA affiliate to all written agreements between the BOC and affiliates for interLATA and exchange access facilities and services. *General Standard Procedures*, Objectives V and VI, Procedure 6. Additionally, the auditors were required to assess whether this same information was made available for public inspection at the BOC's headquarters. *Id.* Instead of examining all web postings, the auditors obtained a random sample of 85 web postings and concluded that four web postings, along with their associated agreements and Officer Certification Statements, were not available for public inspection at the BOC's headquarters. Initial Biennial Report, App. A, Objectives V and VI, Procedure 6 at 18. However, because the auditors failed to examine all web postings in accordance with prescribed procedures, it is quite possible that other transaction data posted on the affiliates' website violated Commission requirements.

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<sup>3</sup> As noted in Part III, even the sampling techniques the auditors used in testing compliance with Objective II, Procedure 3 violated the *General Standard Procedures*.

13. Additionally, to test compliance with Objectives V and VI, the auditors were required to compare the balance sheet of the Section 272 affiliate with “a detailed listing of all fixed assets which agrees with the amount shown in the balance sheet.” *General Standard Procedures*, Objectives V and VI, Procedure 13 at 34. The auditors were also required to determine whether any fixed assets transferred to the Section 272 affiliates constituted “indirect” transfers from the BOC through other affiliates. *Id.* at 35. Instead of examining *all* fixed assets, the auditors “selected a random sample of 86 fixed assets transferred from other non-regulated affiliates.” Initial Biennial Report, App. A, Objectives V and VI, Procedure 13. To make matters worse, because management reportedly could not locate invoices for 14 of the selected fixed assets, the auditors examined only those invoices that were associated with 72 fixed assets. Although the auditors found no instances where the assets of the Section 272 affiliates had been transferred indirectly from the BOC, the audit findings are questionable because the entire universe of fixed assets was never examined. Furthermore, even the auditors’ analysis of the sampled data is incomplete because of management’s failure to produce data. Initial Biennial Report, App. A, Objectives V and VI, Procedure 13.

**III. THE AUDITS ARE FLAWED BECAUSE OF DEFECTS IN THE  
SAMPLING METHODOLOGY AND DEVIATIONS FROM  
PRESCRIBED PROCEDURES.**

14. Not only did the auditors fail to examine the entire population when evaluating certain test criteria, but they also used sampling methodologies that are riddled with errors and otherwise deviated from the agreed-upon procedures. The *General Standard Procedures* refer to two general types of sampling techniques that should be used to test certain



audit procedures (*i.e.* statistical and judgmental sampling).<sup>4</sup> In conducting both statistical and judgmental sampling, the auditors violated fundamental sampling techniques. As a consequence, the findings that are based upon these flawed sampling procedures are either unreliable or invalid. In order to place these issues in context, a discussion of fundamental principles governing sampling methodology follows.

**A. Fundamental Principles Governing Sampling**

15. Generally, a sample should satisfy three criteria: (1) the sample should be drawn from the population of interest and should not systematically exclude any part of the population; (2) the sample should be drawn at random; and (3) the sample should be large enough to support the conclusions that might be drawn.

16. Statistical inferences based on a sample are valid only with respect to the population from which the sample is drawn. If the sample systematically excludes certain elements in the target population, no inferences can be drawn regarding the excluded elements. For example, if the objective of an audit is to determine the level of drug use among 13 to 17 year-olds in a community, the auditors' reliance on information derived solely from a sample of public school students could skew the results. Because adolescents who are excluded from the sample — dropouts and children in private and home schools — could have drug-use patterns

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<sup>4</sup> Judgmental sampling is also known as nonstatistical sampling.

that are substantially different from those of the sampled group, any inferences that the audit attempted to draw about all adolescents would be inaccurate and misleading.<sup>5</sup>

17. In order for a sample to be representative of the population from which it is drawn, a sample should be selected at random. Samples selected by other means (*e.g.* judgmental samples) run the risk of systematically over-representing certain elements in a population, while under-representing others. The *General Standard Procedures*, in apparent recognition of this risk, require the auditor to use random sampling (or stratified random sampling) techniques for most samples.<sup>6</sup>

18. In certain circumstances — particularly where only a very small sample can be selected — it may be appropriate to use judgmental sampling. For example, if the objective of an audit is to conduct case studies of state departments of education, the auditor may determine that, due to time and resource constraints, the evaluation of this governmental agency must be limited to four states. The auditor could use a judgmental sample to ensure that the four selected states have different population sizes and represent each geographical region of the United States. The *General Standard Procedures* call for the use of judgmental samples for a number of test

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<sup>5</sup> See D. GUY, ET. AL., AUDIT SAMPLING 20-21 (2002) (noting that “[a]uditors must exercise caution to avoid projecting sample results to a population if all population items did not have a chance of being included in the sample,” and that, as an example, “it would be improper to conclude that all sales were properly recorded if the sample were selected only from charge sales and excluded cash sales”).

<sup>6</sup> *General Standard Procedures*, Objective I, Procedure 7 at 21; Objective III, Procedures 5 and 6 at 25; Objectives V & VI, Procedures 9, 10 and 12 at 33-34; Objective VIII, Procedures 4 and 5 at 43-44; Objective IX, Procedures 2 and 3 at 46; Objective X, Procedures 3 and 6 at 48; and Objective XI, Procedures 2 and 3 at 51. What probably also falls within this rubric is the instruction to the auditor to conduct “a valid sample.” Objective VII, Procedure 5 at 39.

procedures.<sup>7</sup> Whenever judgmental sampling is used, it is difficult to assess the propriety of the sample unless detailed information is provided regarding the criteria that were used to select the sample.

19. Before selecting a sample, the auditors should determine the acceptable level of uncertainty associated with the results and the sample size that is likely to achieve that level. With this principle in mind, the *General Standard Procedures* contain certain criteria that must be met in selecting a statistically valid sample. The procedures state that, where appropriate, the auditors “shall select a statistically valid sample using random and stratified sampling techniques with the following parameters: a desired confidence level equal to 95%; a desired upper precision limit equal to 5%; and an expected error rate of 1%.”<sup>8</sup>

20. It is unclear precisely how these criteria should be implemented when setting sample sizes. The problem is that the upper precision limit depends on the *observed* error rate — not the expected error rate. This is easiest to understand for samples from a large population. If no errors are observed, a minimum sample size of 59 is required to achieve the desired upper precision limit of 5% with a confidence level of 95%. If even a single error is observed, the sample size required to achieve the desired upper precision limit grows to 93. Because one error in 93 tries is approximately one-percent, the most liberal interpretation of the

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<sup>7</sup> See *General Standard Procedures*, Objective II, Procedure 3 at 22 and Objective IV, Procedure 3 at 26-27. In certain instances the *General Standard Procedures* specify the size of the “random” or “judgmental” sample. *Id.*, Objective II, Procedure 3 at 22 (“judgmental”); Objective VII, Procedure 8 at 39-40 (“random”).

<sup>8</sup> *General Standard Procedures* at 9, ¶ 8.

criteria in the audit procedures would call for a sample size of at least 93 (when the population is large).

21. When the population is not too large, smaller sample sizes could meet the criterion. The reason is that the mean (or proportion) for the complete population consists of a part that is known (*i.e.* the sample) and a part that needs to be estimated from the results for the sample. If the sample constitutes a substantial fraction of the population, there is less uncertainty, and a somewhat smaller sample can achieve the desired precision level.

22. Certain information about the population, sampling method and the sample is required to assess the validity of any inferences drawn from the sampled data. For example, the sizes of the population and sample are required to evaluate the validity of a simple random sample (where each unit is sampled independently with the same probability). For more complicated sampling procedures, more detailed information is needed. For example, the following information is essential in evaluating the validity of a cluster sample:<sup>9</sup> the number of clusters in the population; the number sampled; the distribution of cluster size; how individuals were sampled from clusters; the number of individuals in the population; and the number of individuals sampled.

23. As described in more detail below, the audits consistently violated accepted sampling techniques and otherwise deviated from agreed-upon procedures. These deficiencies

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<sup>9</sup> Cluster sampling is a technique that involves two stages of sampling. In stage 1, a sample of clusters is selected at random from the population of clusters. In stage 2, individual units are sampled at random from each of the clusters sampled in stage 1. For example, a sample of employees in an industry might be selected by sampling companies in the industry and then sampling employees from the sampled companies.

include the exclusion of elements from the sampling frame, the failure to draw a random sample, and the use of samples that are too small to support the inferences drawn therefrom.

Furthermore, because the audits fail to disclose rudimentary information regarding the sampling procedures that were implemented, it is impossible to verify the validity of the sampling application.

**B. Material Deviations from the Fundamental Principles of Sampling and the General Standard Procedures**

24. The auditors violated a basic sampling principle by systematically excluding elements of the population from the sampling frame. Consequently, the samples do not represent the complete population; and the inferences that the auditors attempt to draw regarding the entire population are invalid.

25. In this regard, Section 272(b)(1) provides that the interLATA affiliate must "operate independently from the Bell operating company." 47 U.S.C. § 272(b)(1). As the *General Standard Procedures* explain, this requirement precludes joint ownership of switching and transmission equipment, as well as the land and buildings where such facilities are located. See *General Standard Procedures* at 19.

26. Objective I in the *General Standard Procedures* purportedly tests compliance within these requirements. In that connection, the audit procedures required the auditors to obtain a detailed listing of all fixed assets and verify, *inter alia*, the source from which each asset was acquired.<sup>10</sup> *General Standard Procedures*, Objective I, Procedure 7. Rather than

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<sup>10</sup> Although the audit procedures required an examination of title documents, the auditors did not sample title documents, but instead used "related invoices." Initial Biennial Report, App. A, Objective I, Procedure 7.

examining all fixed assets in accordance with audit procedures, the auditors randomly sampled 100 transmission and switching facilities from the BAGNI detailed listing of fixed assets and collected the associated invoices. *Id.* The auditors further compounded this error by imposing an artificial cost ceiling of \$20,524 for the assets that were sampled. Because the auditors failed to examine the entire population and imposed arbitrary limits on the data that were sampled, no meaningful conclusions about the complete population can possibly be drawn from the sampled data.

27. Objective IV in the *General Standard Procedures* is designed to assess whether the Section 272 affiliate has obtained credit pursuant to any arrangement that would allow a creditor recourse to the assets of the BOC in the event of default. The audit procedures required the auditors to document each Section 272 affiliates' debt agreements with major suppliers. In addition, the auditor was required "[f]or all debt instruments, leases, and credit arrangements maintained by each Section 272 affiliate in excess of \$500,000 of annual obligations and for a sample of 10 debt instruments, leases, and credit arrangements that are less than \$500,000 in annual obligations (judgmental sample), [to] obtain (positive) confirmation from loan institutions, major suppliers, and lessors to attest to the lack of recourse to the BOC assets."

*General Standard Procedures*, Objective IV, Procedure 3.

28. Although it is far from clear, it appears that the auditors failed to obtain the required judgmental sample of "debt instruments, leases and credit arrangements that are less than \$500,000 in annual obligations." Initial Biennial Report, App. A, Objective IV, Procedure 3.<sup>11</sup> Thus, no valid conclusions can be drawn as to whether any debt agreements, leases and credit arrangements falling below the \$500,000 threshold included provisions permitting recourse to the BOC's assets.

29. Additionally, the auditors requested confirmation from 78 major suppliers and lessors. The audit report does not state explicitly whether the auditors canvassed *all* major suppliers and lessors as required; however, the report implies otherwise by referring to "78 major suppliers and lessors to which confirmation requests were sent." Initial Biennial Report, App. A, Objective IV, Procedure 3. If the 78 major suppliers and lessors represented only a sample of the given population, the audit report offers no assurance that the sample was drawn randomly. The audit report also states that 34 suppliers and lessors confirmed that they did not have recourse against the BOC's assets. *Id.* Because suppliers and lessors may have been reluctant to respond if their agreements violated requirements precluding recourse to the assets of the BOC, the auditors' findings based upon less than half of those queried raise the prospect that the results are biased and wholly unreliable. As a consequence, although the auditors uncovered no affiliate agreements that permitted recourse to the assets of the BOC, the deficiencies in the audit process

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<sup>11</sup> The auditors' findings regarding the testing of Objective IV, Procedure 3, glaringly omit any reference to any analysis of debt agreements, leases, and credit agreements falling below the \$500,000 threshold.

render it impossible to determine whether Verizon actually has complied with Commission requirements.

30. Objective VII in the *General Standard Procedures* assesses whether the BOC discriminated against nonaffiliates in favor of its Section 272 affiliates during the provisioning and procurement process. Under the *General Standard Procedures*, the auditors were required to select a statistically valid sample of purchases of goods or services from the BOC by unaffiliated carriers and compare the rates, terms, and conditions of such purchases to those offered to the Section 272 affiliate. *General Standard Procedures*, Objective VII, Procedure 5. Instead of selecting a simple random sample of purchases, the auditors selected a cluster sample which could not be expected to satisfy the precision requirements for a statistically valid sample. In this regard, the auditor first “selected a random sample of 16 unaffiliated entities who contracted or renewed their billing and collection contracts in 2000” and then “selected a random sample of 100 Enterprise customers from the listing of unaffiliated entities referenced above.” *Id.* The audit report provides no information regarding the number of customers that were sampled from each unaffiliated entity. Drawing a cluster sample would increase the uncertainty of the results if customers from the same entity are more homogeneous than customers from other entities. The potential impact of this problem is greater if the total number of entities is large (so that a large number had no sampled customers) or if some entities had substantially more customers sampled than did others (so that the vast majority of customers came from very few entities). Unfortunately, the audit report fails to provide such information.

31. Moreover, the auditors limited the second sample to “Enterprise customers” — a term that is not even referenced in the *General Standard Procedures*. If



Enterprise customers comprise less than the full population, the reported results could be seriously biased. The audit report offers no information about the numerical or financial size of the omitted part of the universe (non-Enterprise customers). Finally, the audit report states that copies of Customer Service Records were obtained only for those Enterprise customers who purchased local services from the BOC. Consequently, the sample for which rates, terms, and conditions for non-affiliates matched those for affiliates may be much less than 100 customers. Again, information is lacking about the actual number of comparisons made.

32. The audits are also seriously flawed because of other instances where the auditors failed to use statistically valid samples in accordance with audit procedures. In that connection, the audits were supposed to assess whether Verizon discriminates in favor of its Section 272 affiliates by providing exchange access services to competitors at rates higher than those offered to Section 272 affiliates. *General Standard Procedures*, Objective IX. The audits purported to test Verizon's compliance with this requirement through a number of procedures.

33. One such procedure required the auditors "[u]sing a statistically valid sample of billed items, [to] inspect underlying details of invoices and compare rates charged, and terms and conditions applied to each Section 272 affiliate with those charged and applied to IXC's for the same services and note any differences." *General Standard Procedures*, Objective IX, Procedure 3. The auditors randomly selected 100 Billing Authority Numbers ("BANS") and for the selected BANS obtained the July 2000 invoices for exchange access services and facilities rendered by the BOC to the Section 272 affiliates. Initial Biennial Report, App. A, Objective IX, Procedure 3. The auditors then selected a random sample of 100 billed items from 54 selected July 2000 invoices. This cluster sampling procedure (*i.e.* sampling billed items from a sample of

invoices) was not called for by the *General Standard Procedures*. Furthermore, the audit report raises a number of questions regarding how the sampling was conducted. A sample of 100 billed items clustered in 54 invoices may be less informative than a simple random sample of 100 billed items. More fundamentally, it is unclear whether the resulting sample was drawn at random, with each billed item having the same chance of being selected. Although the audit report states that billed items were selected at random "from 54 selected July 2000 invoices," the audit report is silent as to whether the 54 invoices were selected at random. *Id.* Also, depending on how the sampling was conducted, some items (*e.g.* those from invoices with fewer items) may have had a greater chance of being selected than others. If so, this phenomenon would bias results from the sample.<sup>12</sup>

34. Additionally, Section 272(b)(3) requires an interLATA affiliate to "have separate officers, directors, and employees from the Bell operating company of which it is affiliate." 47 U.S.C. § 272(b)(3). The *General Standard Procedures* required the auditors to select a statistically valid sample of the employees who transferred from the BOC and determine, through interviews, whether they used any proprietary information that they acquired while employees of the BOC. *General Standard Procedures*, Objective III, Procedure 5. The auditors implemented this procedure by selecting a random sample of and obtaining written confirmation

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<sup>12</sup> The audit report is also confusing at this point. On the one hand, the report refers to "unaffiliated Interexchange Carriers," and, therefore, suggests that more than one such carrier was included in the reported results. On the other hand, the report refers to the "unaffiliated Interexchange Carriers" ("IXC") invoice and implies that a single invoice was examined for a single carrier. If only one IXC was examined, it is unclear how it was selected. *Id.*

from 45 transferred employees. Initial Biennial Report, App. A, Objective III, Procedure 5. As noted above, a statistically valid sample should have included at least 93 employees if the population of transferred employees is large. Unfortunately, the audit report does not provide the size of the population.<sup>13</sup> In all events, the audit report provides no justification for the auditors' decision to select a sample size as small as 45.

35. Objective X, Procedure 6 of the *General Standard Procedures* required the auditors "by using a statistically valid sample of interLATA services offered by the BOC and not through an affiliate, [to] determine whether the BOC is imputing (charging) to itself an amount for access, switching and transport" and compare such rates to those charged to other interexchange carriers. *General Standard Procedures*, Objective X, Procedure 6. The auditors selected three interLATA services: Common Channel Signaling Access Service Gateway Access Service; E911 InterLATA Information Service; and NDA. The audit report does not state explicitly how many qualifying interLATA services were offered by the BOC, but implies that there may have been more than three such services. If that is the case, the auditors failed to conduct statistically valid sampling. Initial Biennial Report, App. A, Objective X, Procedure 6. There is no indication that the three services were selected at random, and, even if they were, a sample of three services would not come close to meeting the precision requirements for a statistically valid sample. Consequently, although the auditors found no differences between

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<sup>13</sup> In addition, the auditor deviated from the requirements of the *General Standard Procedures* by relying on written confirmations rather than face-to-face interviews. Reliance on written confirmations may have reduced the chances of detecting inappropriate disclosure of proprietary information because, unlike a face-to-face interview, written confirmation does not provide the opportunity to evaluate credibility.

publicly-filed tariff rates and the amounts the BOCs charged to themselves for access, switching and transport, the sample is far too small to draw such an inference for the entire population.

36. The audits are flawed in other respects that suggest the audit findings are untrustworthy. The *General Standard Procedures* provide that, as to cash disbursements, the auditor should “judgmentally select 10 cash disbursements *and* 5 payroll transactions of the 272 affiliate and verify that these transactions were funded by and appropriately reflected in the general ledger of the 272 affiliate.” *General Standard Procedures*, Objective II, Procedure 3. The auditors deviated from these requirements by examining “10 cash disbursements (*including* 5 payroll)” instead of “10 cash disbursements *and* 5 payroll transactions.” Initial Biennial Report, App. A, Objective II, Procedure 3. Significantly, this deviation reduced the non-payroll cash disbursements by a factor of two; and, therefore, undermined the accuracy of reported results.

37. In addition, the *General Standard Procedures* include provisions that are purportedly designed to assess whether Verizon markets its affiliate’s interLATA services to inbound callers without informing them of their right to select the interLATA carriers of their choice. *General Standard Procedures*, Objective VII at 37 (citation omitted). To test compliance with this requirement, the auditors were required to listen for 30 minutes each to calls received by five randomly selected representatives at each of three randomly selected BOC call centers. *General Standard Procedures*, Objective VII, Procedure 8. However, instead of observing fifteen representatives (five at three BOC centers), the auditors “remotely observed” only five customer service representatives. Initial Biennial Report, App. A, Objective VII, Procedure 8. To make matters worse, the audit report does not state that the representatives were randomly selected. As a consequence, it is possible that a Verizon supervisor could have

handpicked the best representatives for observation. Furthermore, the validity of the sample would be called into question if the auditors selected the five representatives from a single BOC center, instead of three BOC centers as the procedures required. As noted above, a cluster sample poses more risk of sampling error than a simple random sample whenever units from the same cluster are more homogeneous than units from different clusters.

38. Because of the deficiencies in the sampling methodologies and the auditors' deviations from agreed-upon procedures, the audit findings are highly suspect. As a consequence, the audit findings provide no sound basis upon which any conclusion can be reached that Verizon has complied with its Section 272 obligations.

#### **IV. THE PERFORMANCE DATA SHOW THAT VERIZON HAS DISCRIMINATED AGAINST ITS COMPETITORS.**

39. Even the performance data in the audit reports reveal that Verizon has violated the non-discrimination provisions of Section 272. Section 272 (c) establishes an "unqualified prohibition against discrimination by a BOC in its dealings with its Section 272 affiliate and unaffiliated entities." Implementation of the Non-Accounting Safeguards of Section 271 and 272 of the Communications Act of 1934 as Amended, *First Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 21905, ¶ 197 (1996). The Commission has also emphasized that a "stringent standard" must be applied in evaluating compliance with this anti-discrimination provision. *Id.* When making comparisons of Verizon's performance for non-affiliates and affiliates, it is important to use statistical procedures. By allowing for variability in the services received by customers, statistical analysis can control the risk of rendering an inappropriate conclusion.

40. To avoid concluding incorrectly that Verizon has discriminated against non-affiliates, a statistical test of the null hypothesis should be performed whenever results suggest a lack of parity condition. For the proportion measures, the appropriate test is Fisher's exact test for comparing two proportions. For means, the appropriate test is a two-sample t-test with either pooled or unpooled variances.

41. The audit report includes performance results for Verizon 272 affiliates and non-affiliated carriers on six measures.<sup>14</sup> With respect to each measure, the tables include information regarding the month for which results are reported, the size of the population, and the performance results. Initial Biennial Report, App. A, pp. 34-37, Tables 14a, 14b and 14c. Conspicuously absent from the tables is any reference to the standard deviations for the interval measures<sup>15</sup> — information that is absolutely essential to verify the accuracy of the findings based upon the sampled population. In that connection, the two-sample t-statistic equals the ratio of the difference in means to an estimate of the standard error of that difference. The estimated standard error (whether pooled or unpooled) depends on the observed standard deviations for the affiliate and nonaffiliate samples. Without standard deviations, it is impossible to compute standard errors or t-statistics for the differences that are shown.

42. On their face, the data in the audit report show that Verizon 272 affiliates received shorter completion intervals than non-affiliates. Verizon asserts that a "stare and compare" analysis of the data is "statistically meaningless" because "extremely small volumes of

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<sup>14</sup> AT&T's Comments discuss the inherent deficiencies in the performance measurements used in the audits.

<sup>15</sup> The interval measurements are those on Average Installation Interval, Average Repair Interval, and PIC Change Intervals.

orders for the section 221 affiliates” were processed during these periods. Verizon Response at 6. Verizon’s analysis cannot withstand scrutiny.

43. Even the incomplete information reported in Table 14a confirms that installation intervals for non-affiliates were significantly longer than those for Verizon affiliates. The non-affiliate mean was higher in seven of nine months for both high-speed access and all special access. In June, the only month in which Verizon order volumes exceeded 16 orders, the non-affiliate mean for high-speed access was more than 2.5 times greater than the Verizon mean (25.3 versus 9.9 days). Although the reported data omit the standard deviations which are necessary to compute an exact t-statistic, the difference in performance results would be statistically significant at the 0.05 level for a one-sided test using an unpooled variance for any values of the Verizon standard deviation up to 84 days. Because standard deviations for interval measures are typically from 1.0 to 1.5 times the size of the mean, it is inconceivable that the Verizon standard deviation even approaches 84 days.

44. There also is evidence that non-affiliates received discriminatory service in the other eight months. Excluding June, Verizon’s mean installation time for high-speed access was 24.43 days (n=56) *versus* 31.41 days for nonaffiliates (n=24,503). This difference would also be statistically significant at the 0.05 level for a one-sided test with unpooled variance if the Verizon standard deviation is anything less than 31, which is quite likely given the Verizon mean. Unfortunately, it is impossible to verify this assertion because the audit report fails to disclose any standard deviations.

45. Similarly, the audit report reveals that, in all five months for which data were provided, it took Verizon far longer to complete PIC Changes for non-affiliates than those

for Verizon's affiliates. Initial Biennial Report, App, A, p. 37, Table 14c. In each month, the mean interval for Verizon affiliates is based on more than 3000 intervals, while that for non-affiliates is based on more than 66,000 intervals. For each of the five reported months, the mean interval for non-affiliates is approximately one hour longer than that for Verizon affiliates.

Remarkably, in June, July, and August, the PIC Change intervals for non-affiliates were three times longer than those for Verizon affiliates. *Id.* Although the reported data omit the standard deviations, the difference in performance results would be statistically significant unless the standard deviation for Verizon affiliates exceeded 30 hours — an implausibly large value.

Consequently, there is no doubt that the differences are easily statistically significant for each of the five months.

46. The performance data on the measure for Percent Commitments Met also show that Verizon affiliates received preferential treatment. Across the nine months reported, the data show that Verizon met only 83.2% of the installation commitments for non-affiliates customers, as compared with 89.2% of such commitments for Verizon affiliates. *Id.*, p. 35, Table 14a. This difference is significant at the 5-percent level using a one-sided Fisher's exact test ( $P=0.032$ ). During June, when Verizon had the largest order volumes, the percentage of commitments met for non-affiliates (82.2%) is significantly lower than that for Verizon affiliates



(90.4%) ( $P=0.31$ ).<sup>16</sup> Thus, notwithstanding Verizon's attempt to dismiss the importance of these differences in performance results, the data confirm that Verizon has discriminated against its competitors.

### **CONCLUSION**

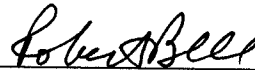
Because of the serious deficiencies in the statistical and non-statistical methodologies that the auditors used to assess compliance with test criteria, there is no sound basis upon which any finding could be made that Verizon has complied with Section 272. Remarkably, even the flawed and woefully inadequate audits confirm that Verizon has discriminated against its competitors. Moreover, although Verizon claims that a "stare and compare" analysis of the data is inherently unreliable because of the small volumes for certain measurements, it is plainly evident that the differences in performance results are statistically significant.

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<sup>16</sup> The results reported for Verizon affiliates in June for All Special Access are erroneous. *Id.*, p. 35, Table 14a. Table 14a shows that 83.8% of commitments were met for the 83 Verizon affiliates. That percentage is inconsistent with the 90.4% reported for the same 83 orders in the section of the table reporting on High Speed Access. The reported percentage for All Special Access must be in error because 83.8% would require a fractional number of met commitments, whereas 75 of 83 equals 90.4%. Apparently, the 83.8% figure was copied erroneously from the nonaffiliate column.

I hereby declare under penalty of perjury that the foregoing is true and accurate to the best of my knowledge and belief.

Executed on April 8, 2002

A handwritten signature in cursive script, appearing to read "Robert M. Bell", is written over a horizontal line.

Robert M. Bell

**ROBERT M. BELL**

**EDUCATION**

Ph.D., Statistics, 1980, Stanford University  
M.S., Statistics, 1973, University of Chicago  
B.S., Mathematics, 1972, Harvey Mudd College

**PROFESSIONAL EXPERIENCE**

1998-Present -- Principal Member Technical Staff, Statistics Research Department, AT&T Labs - Research, Florham Park, NJ  
1991-1999 -- Senior Statistician, RAND, Santa Monica, California; Head, RAND Statistics Group (1993-1995); Member, RAND Graduate School Faculty (1991-1998)  
1988-1991 -- Statistician, Social Policy Department, RAND, Santa Monica, California  
1980-1988 -- Associate Statistician, Economics and Statistics Department, RAND, Santa Monica, California  
1975-1979 -- Teaching Assistant/Research Assistant, Department of Statistics, Stanford University.  
1973-1975 -- Consultant and Mathematical Assistant, Economics Department, The RAND Corporation, (also intermittently during educational leave).

**RESEARCH AREAS**

**Experimental Design and Survey Development.** Dr. Bell supervised statistical design of Project Alert, an experiment of drug abuse prevention in thirty California and Oregon junior high schools. This work has involved data collection and analysis for sample selection/assignment, development of a series of 30 page questionnaires, and design of sampling procedures for several secondary analyses.

**Data Analysis.** Dr. Bell supervised the main data analysis in Project ALERT. He previously supervised analysis of clinical data from the National Preventive Dentistry Demonstration Program, a study of school-based preventive treatments. Data from that study included one to five annual examinations of 30,000 children in 10 communities, over 10,000 replicate examinations, and 20,000 surveys.

**Statistical Methodology.** Dr. Bell's methodological interests include survey research methods, analysis of data from complex samples, record linkage methods, analysis of missing data, measurement and scaling, robust procedures, empirical Bayes estimation, and sample reuse methods.

## PROFESSIONAL ORGANIZATIONS/HONORS

Elected Fellow, American Statistical Association, 1998.  
Member, Committee on National Statistics, National Academy of Sciences, 2001-present.  
Member, Panel to Review the 2000 Census, National Academy of Sciences, 1998-present.  
Chair, American Statistical Association Subcommittee, Census Advisory Committee of Professional Associations, 1997-1998; Member, 1995-2000.  
Member, Panel on Alternative Census Methodologies, National Academy of Sciences, 1995-1999.  
Member, Committee on Minorities in Statistics, American Statistical Association, 1995-2000.  
Member, Panel to Evaluate Alternative Census Methods, National Academy of Sciences, 1992-1994.  
Visiting Lecturer for American Statistical Association, 1984-1986.  
Program Chairman, Applied Statistics Workshop, Southern California Section of American Statistical Association, 1984.  
Institute of Mathematical Statistics, since 1979.  
American Statistical Association, since 1974.

## PUBLICATIONS

### Published Articles

"School-Based Drug Prevention: Challenges in Designing and Analyzing Social Experiments," in *Public Policy and Statistics: Case Studies from RAND*, eds. S.C. Morton and J.E. Rolph, Springer-Verlag, New York, 2000.

"Appropriateness of the Decision to Transfer Nursing Facility Residents to the Hospital," *Journal of the American Geriatric Society*, Vol. 48, 2000, 154-163 (Saliba, Kington, Buchanan, Bell, et al.).

"A Clinically Detailed Risk Information System for Cost," *Health Care Financing Review*, Vol. 21, 2000, 1-27 (Carter, Bell Dubois, Goldberg, Keeler, McAlearney, Post, and Rumpel).

"Cross-Lagged Relationships among Adolescent Problem Drug Use, Delinquent Behavior, and Emotional Distress," *Journal of Drug Issues*, Vol. 30, 2000, 283-304 (Bui, Ellickson, and Bell).

"Adolescent Use of Illicit Drugs Other Than Marijuana: How Important is Social Bonding ant for Which Ethnic Groups?" *Substance Use and Misuse*, Vol. 34, 1999, 317-346 (Ellickson, Collins, and Bell).

"Simultaneous Polydrug Use among Teens: Prevalence and Predictors," *Journal of Substance Use*, Vol. 10, 1999, 233-253 (Collins, Ellickson, and Bell).

"Physician Response to Prenatal Substance Exposure," *Maternal and Child Health Journal*, 1999, 29-38 (Zellman, Bell, Archie, DuPlessis, Hoube, and Miu).

"Underuse and Overuse of Diagnostic Testing for Coronary Artery Disease in Patients Presenting with New-Onset Chest Pain," *American Journal of Medicine*, 1999, 391-398, (Carlisle, Leape, Bickel, Bell, et al.).

"Underuse of Cardiac Procedures: Do Women, Ethnic Minorities, and the Uninsured Fail to Receive Needed Revascularization?," *Annals of Internal Medicine*, Vol. 130, 1999, 183-192 (Leape, Hilborne, Bell, Kamberg, and Brook).

"The Sexual Practices of Asian and Pacific Islander High School Students," *Journal of Adolescent Health*, Vol. 23, 1998, 221-231 (Schuster, Bell, Nakajima, and Kanouse).

"Does Early Drug Use Increase the Risk of Dropping out of High School?," *Journal of Drug Issues*, Vol. 28, 1998, 357-380 (Ellickson, Bui, Bell, and McGuigan).

"Impact of a High School Condom Availability Program on Sexual Attitudes and Behaviors," *Family Planning Perspectives*, Vol. 30, 1998, 67-72 & 88 (Schuster, Bell, Berry, and Kanouse).

"Analytic Versus Holistic Scoring of Science Performance Tasks," *Applied Measurement in Education*, Vol. 11, 1998, 121-137 (Klein, Stecher, Shavelson, McCaffrey, Ormseth, Bell, Comfort, and Othman).

"Influencing Physician Response to Prenatal Substance Exposure Through State Legislation and Work-Place Policies," *Addiction*, Vol. 92, 1997, 1123-1131 (Zellman, Jacobson, and Bell).

"Adjusting Cesarean Delivery Rates for Case Mix," *Health Services Research*, Vol. 32, 1997, 509-526. (Keeler, Park, Bell, Gifford, and Keesey).

"Students' Acquisition and Use of School Condoms in a High School Condom Availability Program," *Pediatrics*, Vol. 100, October 1997, 689-694 (Schuster, Bell, Berry, and Kanouse).

"Impact Of Response Options And Feedback About Response Inconsistencies On Alcohol Use Self-Reports By Microcomputer," *Journal of Alcohol and Drug Education*, Vol. 42, 1997, 1-18 (Hays, Bell, Gillogly, Hill, Giroux, Davis, Lewis, Damush, and Nicholas).

"Adjusting for Attrition in School-Based Samples: Bias, Precision, and Cost Trade-Offs of Three Methods," *Evaluation Review*, Vol. 21, October 1997, 554-567 (McGuigan, Ellickson, Hays, and Bell).

"Teenagers and Alcohol Misuse in the United States: By any Definition, it's a Big Problem," *Addiction*, Vol. 91, 1996, 1489-1506 (Ellickson, McGuigan, Adams, Bell, and Hays).

"Communication Between Adolescents and Physicians About Sexual Behavior and Risk Prevention," *Archives of Pediatrics and Adolescent Medicine*, Vol. 150, 1996, 906-913 (Schuster, Bell, Petersen, and Kanouse).

"The Sexual Practices of Adolescent Virgins: Genital Sexual Activities of High School Students Who Have Never Had Vaginal Intercourse," *American Journal of Public Health*, Vol. 86, 1996, 1570-1576 (Schuster, Bell, and Kanouse).

"How Will the NCAA's New Standards Affect Minority Student-Athletes?," *Chance*, Vol. 8, 18-21, Summer 1995 (Klein and Bell).

"Discussion of Census 2000: Statistical Issues in Reengineering the Decennial Census," *Proceedings of the Social Statistics Section, American Statistical Association*, 1995, 17-18 (Bell).

"Effects of Reporting Methods on Infant Mortality Rate Estimates for Racial and Ethnic Subgroups," *Journal of Health Care for the Poor and Underserved*, Vol. 6, 1995, 60-75 (Farley, Richards, and Bell).

"Do Response Options Influence Self-Reports of Alcohol Use?," *The International Journal of the Addictions*, Vol. 29, 1994, 1909-1920 (Hays, Bell, Damush, Hill, DiMatteo, and Marshall).

"The Utility of Multiple Raters and Tasks in Science Performance Assessments," *Educational Assessment*, Vol. 2, 1994, 257-272 (Saner, Klein, Bell, and Comfort).

"Sampling and Statistical Estimation in the Decennial Census," *Proceedings of the Section on Survey Research Methods, American Statistical Association*, 1994, 71-79 (Bell).

"The Impact of Response Options and Location in a Microcomputer Interview on Drinking Drivers' Alcohol Use Self-Reports," *Alcohol and Alcoholism*, Vol. 29, 1994, 203-209 (Hays, Bell, Hill, Gillogly, Lewis, Marshall, Nicholas, and Marlatt).

"The Urge to Merge: Linking Vital Statistics Records and Medicaid Claims," *Medical Care*, Vol. 32, 1994, 1004-1018, reprinted by invitation in *Yearbook of Medical Informatics*, 1995, 366-380 (Bell, Keesey, and Richards).

"The 1966 Enactment of Medicare: Its Effect on Discharges from Los Angeles County-Operated Hospitals," *American Journal of Public Health*, Vol. 84, 1994, 1325-1327 (Glassman, Bell, and Tranquada).

"The Urge to Merge: A Computational Method for Linking Datasets with No Unique Identifier," *Proceedings of the 18th Annual SAS Users' Group International Conference, 1993* (Bell, Keesey, and Richards).

"Using Response Agreement to Evaluate Suspect Links on a Longitudinal Survey," *Proceedings of Section on Survey Research Methods, American Statistical Association, 1993*, 286-291 (Bell).

"Changing Adolescent Propensities to Use Drugs: Results from Project ALERT," *Health Education Quarterly*, Vol. 20, 1993, 227-242 (Ellickson, Bell, and Harrison).

"Response Times for the CAGE, Short-MAST, AUDIT, and JELLINEK Alcohol Scales," *Behavior Research Methods, Instruments, & Computers*, Vol. 25, 1993, 304-307 (Hays, Hill, Gillogly, Lewis, Bell, and Nicholas).

"Do Drug Prevention Effects Persist into High School? How Project ALERT Did with Ninth Graders," *Preventive Medicine*, Vol. 22, 1993, 463-483 (Bell, Ellickson, and Harrison).

"Preventing Adolescent Drug Use: Long Term Results of a Junior High Program," *American Journal of Public Health*, Vol. 83, 1993, 856-861 (Ellickson, Bell, and McGuigan).

"Stepping Through the Drug Use Sequence: Longitudinal Scalogram Analysis of Initiation and Regular Use," *Journal of Abnormal Psychology*, Vol. 101, 1992, 441-451 (Ellickson, Hays, and Bell).

"New DEALEs: Other Approximations of Life Expectancy," *Medical Decision Making*, Vol. 12, 1992, 307-311 (Keeler and Bell).

"A Microcomputer Assessment System (MAS) for Administering Computer-Based Surveys: Preliminary Results from Administration to Clients at an Impaired-Driver Treatment Program," *Behavior Research Methods, Instruments, & Computers*, Vol. 24, 1992, 358-365 (Hays, Gillogly, Hill, Lewis, Bell, and Nicholas).

"Challenges to Social Experiments: A Drug Prevention Example," *J. Res. in Crime and Delinquency*, Vol. 29, 1992, 79-101 (Ellickson and Bell).

"Preventing Drug Use among Young Adolescents," *The Education Digest*, Vol. 56, 1990, 63-67 (Ellickson and Bell).

"Assessing Cost Effects of Nursing-Home-based Geriatric Nurse Practitioners," *Health Care Financing Review*, Vol. 11, No. 3, 1990, 67-78 (Buchanan, Bell, Arnold, Witsberger, Kane, and Garrard).

"Drug Prevention in Junior High: A Multi-Site Longitudinal Test," *Science*, Vol. 247, 1990, 1299-1305 (Ellickson and Bell).

"A Case Study in Contesting the Conventional Wisdom: School Based Fluoride Mouthrinse Programs in the USA," *Community Dentistry and Oral Epidemiology*, Vol. 18, 1990, 46-54 (Disney, Bohannon, Klein, and Bell).

"Does Pooling Saliva for Cotinine Testing Save Money Without Losing Information?," *Journal of Behavioral Medicine*, Vol. 12, October 1989, 503-507 (Bell and Ellickson).

"Affirmative Action in Medical Education and its Effect on Howard and Meharry: A Study of the Class of 1975," *Journal of the National Medical Association*, Vol. 80, 1988, 153-158 (Klein, Bell, and Williams).

"Game-Theoretic Optimal Portfolios," *Management Science*, Vol. 34, 1988, 724-733 (Bell and Cover).

"Value Preferences for Nursing Home Outcomes," *The Gerontologist*, Vol. 26, 1986, 303-308 (Kane, Bell, and Riegler).

"Conjecture Versus Empirical Data: A Response to Concerns Raised about the National Preventive Dentistry Demonstration Program (Different Views)," *Am J. Public Health*, Vol. 76, 1986, 448-452 (Klein, Bohannon, Bell, Disney, and Graves).

"Effects of Affirmative Action in Medical Schools, a Study of the Class of 1975," *New England Journal of Medicine*, Vol. 313 (Special Article), 1985, 519-525 (Keith, Bell, Swanson, and Williams).

"The Cost and Effectiveness of School-Based Preventive Dental Care," *American Journal of Public Health*, Vol. 75, 1985, 382-391 (Klein, Bohannon, Bell, Disney, Foch, and Graves).

"Management and Evaluation of the Effects of Misclassification in a Controlled Clinical Trial," *Journal of Dental Research*, Vol. 63 (Special Issue), 1984, 731-734 (Bell and Klein).

"Predicting the Course of Nursing Home Patients: A Progress Report," *The Gerontologist*, Vol. 23, 1983, 200-206 (Kane, Bell, Riegler, Wilson, and Keeler).

"Assessing the Outcomes of Nursing-Home Patients," *Journal of Gerontology*, Vol. 38, 1983, 385-393 (Kane, Bell, Riegler, Wilson, and Kane).



"An Adaptive Choice of the Scale Parameter for M-Estimators of Location," Ph.D. thesis, Stanford University, 1980 (Bell).

"Competitive Optimality of Logarithmic Investment," *Mathematics of Operations Research*, Vol. 5, 1980, 161-166 (Bell and Cover).

### **National Academy of Sciences Panel Reports**

*Measuring a Changing Nation: Modern Methods for the 2000 Census*, Panel to Evaluate Alternative Census Methodologies, National Research Council, Committee on National Statistics, Michael L. Cohen, Andrew A. White, and Keith F. Rust (Eds.), National Academy Press, Washington, D.C., 1999.

*Preparing for the 2000 Census: Interim Report II*, Panel to Evaluate Alternative Census Methodologies, National Research Council, Committee on National Statistics, Andrew A. White and Keith F. Rust (Eds.), National Academy Press, Washington, D.C., 1997.

*Sampling in the 2000 Census: Interim Report I*, Panel to Evaluate Alternative Census Methodologies, National Research Council, Committee on National Statistics, Andrew A. White and Keith F. Rust (Eds.), National Academy Press, Washington, D.C., 1996.

*Counting People in the Information Age, Final Report*, Panel to Evaluate Alternative Census Methods, Committee on National Statistics, Commission on Behavioral and Social Sciences and Education, National Research Council, National Academy Press, Washington, D.C., 1994.

*A Census that Mirrors America, Interim Report*, Panel to Evaluate Alternative Census Methods, Committee on National Statistics, Commission on Behavioral and Social Sciences and Education, National Research Council, National Academy Press, Washington, D.C. 1993.

### **RAND Publications**

*The Sexual Practices of Asian and Pacific Islander High School Students*, RP-744, RAND, 1998 (Schuster, Bell, Nakajima, and Kanouse).

*Analysis of Data from Complex Surveys* (videorecording), Statistics Short Course Series, V-092, RAND, 1997 (McCaffrey and Bell).

*Graphical Methods for Data Analysis*, (videorecording), Statistics Short Course Series, V-022 through V-025, RAND 1996 (Bell and McCaffrey).

*Defining Infants' Race and Ethnicity in a Study of Very Low Birthweight Infants*, MR-191-AHCPR, RAND, 1993 (Farley, Richards, and Bell).

*Do Teens Tell the Truth? The Validity of Self-Reported Tobacco Use in Adolescents*, N-3291-CHF, RAND, July 1991 (Freier, Bell, and Ellickson).

*How Accurate Are Adolescent Reports of Drug Use?*, N-3189-CHF, RAND, May 1991 (Reinisch, Bell, and Ellickson).

*Multiplying Inequalities, The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science*, R-3928-NSF, RAND, July 1990 (Oakes, Ormseth, Bell, and Camp).

*Baseline Nonresponse in Project ALERT: Does it Matter?*, N-2933-CHF, The RAND Corporation, Santa Monica, California, April 1990 (Bell, Gareleck, and Ellickson).

*Prospects for Preventing Drug Use Among Young Adolescents*, R-3896-CHF, The RAND Corporation, Santa Monica, California, March 1990 (Ellickson and Bell).

*The Role of Professional Background, Case Characteristics, and Protective Agency Response in Mandated Child Abuse Reporting*, R-3825-HHS, The RAND Corporation, Santa Monica, California, January 1990 (Zellman and Bell).

*Results from the Evaluation of the Massachusetts Nursing Home Connection Program*, JR-01, The RAND Corporation, Santa Monica, California, October 1989 (Buchanan, Kane, Garrard, Bell, Witsberger, Rosenfeld, Skay, and Gifford).

*A Matched Sampling Algorithm for the Nursing Home Connection Demonstration*, N-2823-HCFA, The RAND Corporation, Santa Monica, California, July 1989 (Buchanan, Bell, Witsberger, Kane, Garrard, Rosenfeld, and McDermott).

*Provider Visit Patterns to Nursing Home Patients*, N-2824-HCFA, The RAND Corporation, Santa Monica, California, June 1989 (Buchanan, Witsberger, Bell, Kane, Garrard, and Rosenfeld).

*The Financial Impact of Nursing Home-Based Geriatric Nurse Practitioners, An Evaluation of the Mountain States Health Corporation GNP Project*, R-3694-HCFA/RWJ, The RAND Corporation, Santa Monica, California, May 1989 (Buchanan, Arnold, Bell, Witsberger, Kane, Garrard).

*Designing and Implementing Project ALERT, A Smoking and Drug Prevention Experiment*, R-3754-CHF, The RAND Corporation, Santa Monica, California, December 1988 (Ellickson, Bell, Thomas, Robyn, and Zellman).

*Assessing the Outcome of Affirmative Action in Medical Schools, A Study of the Class of 1975*, R-3481-CWF, The RAND Corporation, Santa Monica, California, August 1987 (Keith, Bell, and Williams).

*The Cost and Effectiveness of School-Based Preventive Dental Care*, R-3203-RWJ, The RAND Corporation, Santa Monica, California, April 1985 (Klein, Bohannon, Bell, Disney, Foch, and Graves).

*The Dynamic Retention Model*, N-2141-MIL, The RAND Corporation, Santa Monica, California, April 1985 (Fernandez, Gotz, and Bell).

*The Reliability of Clinical and Radiographic Examinations in the National Preventive Dentistry Demonstration Program*, R-3138-RWJ, The RAND Corporation, Santa Monica, California, June 1984 (Klein, Bell, Bohannon, Disney, and Wilson).

*Treatment Effects in the National Preventive Dentistry Demonstration Program*, R-3072-RWJ, The RAND Corporation, Santa Monica, California, February 1984 (Bell, Klein, Bohannon, Disney, Graves, and Madison).

*Outcome-Based Reimbursement for Nursing-Home Care*, R-3092-NCHSR, The RAND Corporation, Santa Monica, California, December 1983 (Kane, Bell, Hosek, Riegler, and Kane).

*The Military Application Process: What Happens and Can it be Improved?*, R-2986-MRAL, The RAND Corporation, Santa Monica, California May 1983 (Berryman, Bell, and Lisowski).

*Predicting the Course of Nursing Home Patients: A Progress Report*, N-1786-NCHSR, The RAND Corporation, Santa Monica, California, January 1982 (Kane, Riegler, Bell, Potter, and Koshland).

*Results of Baseline Dental Examinations in the National Preventive Dentistry Demonstration Program*, R-2862-RWJ, The RAND Corporation, Santa Monica, California, April 1982 (Bell, Klein, Bohannon, Graves, and Disney).

*CETA: Is it Equitable to Women?*, N-1683-DOL, The RAND Corporation, Santa Monica, California, May 1981 (Berryman, Chow, and Bell).

*Plan for the Analysis of Dental Examination Data in the National Preventive Dentistry Demonstration Program*, N-1658-RWJ, The RAND Corporation, Santa Monica, California, April 1981 (Klein and Bell).

*Medical School and Physician Performance: Predicting Scores on the American Board of Internal Medicine Written Examination*, R-1723-HEW, The RAND Corporation, Santa Monica, CA, August 1977 (Bell).